

29. Determine all polynomial solutions of the recurrence

$$(4n + 9)a(n) - 4(n + 1)a(n + 1) + 3a(n + 2) = 0.$$

30. Prove that the sequence of harmonic numbers  $(H_n)_{n \geq 0}$  is not a polynomial sequence.

31. Is there a difference between  $\mathbb{K}[x][[y]]$  and  $\mathbb{K}[[y]][x]$ ?

32. Implement a program in your favourite computer algebra system that sums a given polynomial sequence using

(a) falling factorial representation.

(b) interpolation (you may use built-in commands to execute the interpolation, e.g., in Mathematica the command `InterpolatingPolynomial`).

Compute some test cases, in particular compare the timings for the sparse and dense polynomial given in `testcases.m`.